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EXAMINER	
FORMAN, BETTY J	
ART UNIT	PAPER NUMBER
1634	

NOTIFICATION DATE	DELIVERY MODE
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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

IPOPS.LEGAL@agilent.com

Office Action Summary	Application No.	Applicant(s)	
	10/813,337	PECK ET AL.	
	Examiner	Art Unit	
	BJ Forman	1634	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *15 May 2008*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1,3-7,9-11,14-16 and 28-37* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1, 3-7, 9-11, 14-16, 28-37* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

FINAL ACTION

Status of the Claims

1. This action is in response to papers filed 15 May 2008 in which claims 1, 3, 6, 9-10 were amended, claims 2, 8, 12-13, 17-27 were canceled and claims 29-36 were added. The amendments to claim 1 newly define the method to require a printing station a movement of the substrate from the printing station. The amendments have been thoroughly reviewed and entered.

The previous rejections in the Office Action dated 15 February 2008 are withdrawn in view of the amendments. Applicant's arguments have been thoroughly reviewed but are deemed moot in view of the amendments, withdrawn rejections and new grounds for rejection. New grounds for rejection, necessitated by the amendments, are discussed.

Claims 1, 3-7, 9-11, 14-16, 28-37 are under prosecution.

Claim Objections

2. a. Claim 1 is objected to because of the following informalities: The word "difference" appears in line 22, which appears to be a misspelling of "different" Appropriate correction is required.

b. The numbering of claims is not in accordance with 37 CFR 1.126 which requires the original numbering of the claims to be preserved throughout the prosecution. When claims are canceled, the remaining claims must not be renumbered. When new claims are presented, they must be numbered consecutively beginning with

the number next following the highest numbered claims previously presented (whether entered or not).

The claim listing includes 2 claims identified as "Claim 32".

The misnumbered claims starting with the second claim 32, have been renumbered 33-37.

Claim Rejections - 35 USC § 112

3. The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

4. Claims 30-33 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claims 30-33, each identify the "the plane of the flow cell and the horizontal plate of the environment is at least 5°(30°, 60°, 75°)". The claims are indefinite because the claims do not define a relationship providing the angle.

Claim Rejections - 35 USC § 103

5. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

6. Claims 1, 3-4, 28, 34-37 are rejected under 35 U.S.C. 103(a) as being unpatentable over Bass et al (U.S. Patent No. 6,420,180, issued 16 July 2002) in view of Anderson et al (U.S. Patent No. 5,186,824, issued 16 February 1993).

Regarding Claim 1, Bass et al disclose a method of producing an array of at least two different polymers covalently bonded to a surface (Column 7, lines 20-24), the method comprising contacting blocked monomer to a first and second location of a surface having functional groups (Column 13, lines 35-57), to produce covalently linked monomers, removing blocking groups of the monomers without exposing the surface to triple phase interphase gas, solid liquid (e.g. all additional steps are performed in flood station #68, Column 7, line 20-Column 9, line 9) and reiterating the steps to produce an array having at least two polymers at the first and second locations. Bass et al teach the method wherein the functional group generation step comprises sequentially contacting at least a portion of the surface with different liquids (Column 8, lines 57-Column 9, line 9). Bass et al teach the method wherein the functional group generation step occurs in a flow cell i.e. flood station (Column 8, lines 57-Column 9, line 9). Bass et al teach the method wherein the monomers are deposited using a pulse-jet (Column 4, line 44-Column 8-Column 9, line 9). Bass further teach the method wherein the substrate is moved between the flow cell and monomer print station for monomer addition via pulse jet (Column 9).

Bass et al specifically teach sequentially contacting at least a portion of the surface with different liquids (Column 8, lines 57-Column 9, line 9) but does not specifically teach that the sequentially applied liquids displace previous liquid.

However sequential application of liquids via liquid-liquid displacement was well known and routinely practiced in the art of polymer synthesis at the time the claimed invention was made as taught by Anderson et al.

Anderson et al teach a similar method of producing an array of at least two different polymeric ligands (e.g. oligonucleotides synthesized on a solid support (e.g. particle, membrane, disc Column 6, lines 49-56) wherein the method comprises contacting a blocked monomer at first and second locations having functional groups (e.g. cpg supports having the first monomer attached, Column 19, lines 55-58) under conditions sufficient for the monomer to covalently bond to the surface, removing blocking groups to generate a function group and reiterating the steps to produce the array of at least two ligands (Column 19, line 55-Column 20, line 50). Anderson et al further the method wherein the solid supports are exposed to reagents sequentially wherein the reagents are kept separate based on density (Column 5, lines 3-38 and Column 6, lines 13-36) forming a liquid-liquid interface such that the solid support is not exposed to a triple phase interface (Column 12, lines 28-67 and Fig. 2A-2D). Anderson et al disclose the method wherein the functional group generation comprises sequentially contacting at least a portion of the surface with a plurality of liquids (Column 6, line 57-Column 7, line 14) wherein the different liquids include at least an oxidizing liquid, a deblocking liquid, a wash liquid, and a capping liquid (Column 13, line 59-Column 14, line 11 and Column 19, line 55-Column 20, line 50).

Anderson et al further teach the method wherein the sequentially applied liquids have a different density greater than zero (i.e. increasing density, Column 6, line 57-

Column 7, line 14) wherein the sequential contact is performed by displacing a previous liquid with an immediately subsequent liquid produce a stratified liquid interface that moves across the surface (Column 7, line 60-Column 8, line 3, Column 12, lines 28-67 and Fig. 2A-2D).

Anderson et al also teaches that reagent solutions used for polymer synthesis are incompatible (Column 3). To overcome the problems of incompatible reagents, Anderson introduces the reagents at differing densities so as to form a stratified liquid interface moving across the flow cell (Column 5, lines 1-19) thereby eliminating extensive washing between synthesis steps and reducing the waste of expensive reagents (Column 3, lines 54-59).

It would have been obvious to one of ordinary skill in the art at the time the claimed invention was made to apply the fluid displacement synthesis of Anderson et al to the polymer synthesis of Bass et al. One of ordinary skill in the art would have been motivated to do so with a reasonable expectation of success based on the problems using incompatible reagents as taught by Anderson et al (Column 3, lines 54-59) and for the benefit of eliminating the intervening washing thereby reducing waste of time and expensive reagents. One of ordinary skill would have been further motivated to apply the sequential application of synthesis reagents using displacing fluids of differing densities as taught by Anderson to the method of Bass so as to maintain separation between incompatible reagents with precise control and timing (Anderson, Column 5, lines 1-38).

Regarding Claim 3, Bass et al teach the method different liquids includes an oxidizing liquid and deblocking liquid (Column 8, lines 57-Column 9, line 9).

Regarding Claim 4, Bass et al teach the method different liquids includes a washing liquid (Column 8, lines 57-Column 9, line 9).

Regarding Claim 28, Bass et al teach the method wherein the substrate is planar (Fig. 1).

Regarding Claims 34-35, Bass et al teach the method wherein at least 10 different polymers are produced (Fig. 1-2).

Regarding Claim 36-37, Bass et al teach the method wherein the substrate is moved using a robotic arm (i.e. transporter #60, Fig. 6).

7. Claims 1, 3-7, 9-11, 14-16, 28, 34-37 are rejected under 35 U.S.C. 103(a) as being unpatentable over Bass (B) (U.S. Patent No. 6,440,669, issued 27 August 2002) in view of Anderson et al (U.S. Patent No. 5,186,824, issued 16 February 1993).

Regarding Claims 1, 6-7, Bass (B) discloses a method of producing an array of at least two different polymers covalently bonded to a surface (Column 10, lines 59-67), the method comprising contacting blocked monomer to a first and second location of a surface having functional groups to produce covalently linked monomers (Column 10, lines 24-67), wherein the contacting occurs at a printing station (platform #32), moving the substrate to a flow cell (stage #41 for flooding the surface, Column 11, lines 43-50)

removing blocking groups of the monomers and sequentially adding a plurality of different liquids at the flow cell station (Column 16, lines 7-63) and reiterating the substrate transfer, monomer addition, substrate transfer and sequential liquid application to produce a plurality of different polymers at different locations on the support (Column 8, lines 8-31).

Bass (B) specifically teaches sequentially contacting at least a portion of the surface with different liquids (Column 16, lines 7-63) but does not specifically teach that the sequentially applied liquids displace previous liquid.

However sequential application of liquids via liquid-liquid displacement was well known and routinely practiced in the art of polymer synthesis at the time the claimed invention was made as taught by Anderson et al.

Anderson et al teach a similar method of producing an array of at least two different polymeric ligands (e.g. oligonucleotides synthesized on a solid support (e.g. particle, membrane, disc Column 6, lines 49-56) wherein the method comprises contacting a blocked monomer at first and second locations having functional groups (e.g. cpg supports having the first monomer attached, Column 19, lines 55-58) under conditions sufficient for the monomer to covalently bond to the surface, removing blocking groups to generate a function group and reiterating the steps to produce the array of at least two ligands (Column 19, line 55-Column 20, line 50). Anderson et al further the method wherein the solid supports are exposed to reagents sequentially wherein the reagents are kept separate based on density (Column 5, lines 3-38 and Column 6, lines 13-36) forming a liquid-liquid interface such that the solid support is not

exposed to a triple phase interface (Column 12, lines 28-67 and Fig. 2A-2D). Anderson et al disclose the method wherein the functional group generation comprises sequentially contacting at least a portion of the surface with a plurality of liquids (Column 6, line 57-Column 7, line 14) wherein the different liquids include at least an oxidizing liquid, a deblocking liquid, a wash liquid, and a capping liquid (Column 13, line 59-Column 14, line 11 and Column 19, line 55-Column 20, line 50).

Anderson et al further teach the method wherein the sequentially applied liquids have a different density greater than zero (i.e. increasing density, Column 6, line 57-Column 7, line 14) wherein the sequential contact is performed by displacing a previous liquid with an immediately subsequent liquid produce a stratified liquid interface that moves across the surface (Column 7, line 60-Column 8, line 3, Column 12, lines 28-67 and Fig. 2A-2D).

Anderson et al also teaches that reagent solutions used for polymer synthesis are incompatible (Column 3). To overcome the problems of incompatible reagents, Anderson introduces the reagents at differing densities so as to form a stratified liquid interface moving across the flow cell (Column 5, lines 1-19) thereby eliminating extensive washing between synthesis steps and reducing the waste of expensive reagents (Column 3, lines 54-59).

It would have been obvious to one of ordinary skill in the art at the time the claimed invention was made to apply the fluid displacement synthesis of Anderson et al to the polymer synthesis of Bass et al. One of ordinary skill in the art would have been motivated to do so with a reasonable expectation of success based on the problems

using incompatible reagents as taught by Anderson et al (Column 3, lines 54-59) and for the benefit of eliminating the intervening washing thereby reducing waste of time and expensive reagents. One of ordinary skill would have been further motivated to apply the sequential application of synthesis reagents using displacing fluids of differing densities as taught by Anderson to the method of Bass so as to maintain separation between incompatible reagents with precise control and timing (Anderson, Column 5, lines 1-38).

Regarding Claim 3, Bass (B) teaches the method different liquids includes an oxidizing liquid and deblocking liquid (Column 10, lines 42-58 and Column 16, lines 7-63).

Regarding Claim 4, Bass (B) teaches the method different liquids includes a washing liquid (Column 10, lines 42-58 and Column 16, lines 7-63).

Regarding Claim 5, Bass (B) teaches the method different liquids includes a capping liquid (Column 10, lines 42-58 and Column 16, lines 7-63).

Regarding Claims 6-7, Anderson et al further teach the method wherein the sequentially applied liquids have a different density greater than zero (i.e. increasing density, Column 6, line 57-Column 7, line 14).

Regarding Claim 9, Anderson et al further teach the sequential contact is performed by displacing a previous liquid with an immediately subsequent liquid produce a stratified liquid interface that moves across the surface (Column 7, line 60-Column 8, line 3, Column 12, lines 28-67 and Fig. 2A-2D).

Regarding Claim 10-11, 14-15 Anderson et al disclose a method of producing an array of at least two different polymeric ligands (e.g. oligonucleotides synthesized on control pore glass, the two different sequences being e.g. product and failed sequences, Column 20, lines 10-25).

Anderson et al disclose the method comprising contacting a blocked monomer at first and second locations having functional groups (e.g. cpg supports having the first monomer attached, Column 19, lines 55-58) under conditions sufficient for the monomer to covalently bond to the surface, removing blocking groups to generate a function group and reiterating the steps to produce the array of at least two ligands (Column 19, line 55-Column 20, line 50). Anderson et al teach the method wherein the solid supports are exposed to reagents sequentially wherein the reagents are kept separate based on density (Column 5, lines 3-38 and Column 6, lines 13-36) forming a liquid-liquid interface such that the solid support is not exposed to a triple phase interface (Column 12, lines 28-67 and Fig. 2A-2D).

Anderson et al further teach the method wherein the flow rate is controlled and monitored during passage of reagents (Column 5, lines 25-27; Column 14, lines 44-53 21) and further teach that it is important to control the flow rate because some synthesis steps take more or less time than other steps and because reagent waste resulting from excess use of reagents is expensive (Column 21, lines 30-65) but they are silent regarding specific flow rates. However, the reference clearly suggests that the flow rate is adjusted to maximize reagents and synthetic step. Therefore, It would have been obvious to one of ordinary skill in the art at the time the claimed invention was

made to adjust the flow rate during the synthesis steps of Anderson to obtain optimal flow rates (e.g. about 1-20 cm/x). One of ordinary skill in the art would have been motivated to do adjust the flow rate so as to maximize syntheses reaction with minimal waste of reagents as desired by Anderson et al (Column 21, lines 30-65).

Regarding Claim 16, Bass (B) teaches the method different liquids includes a capping liquid contacting the surface between the oxidizing and deblocking liquid (Column 10, lines 42-58 and Column 16, lines 7-63).

Regarding Claim 28, Bass (B) teaches the method wherein the substrate is planar (Fig. 1).

Regarding Claims 34-36 Bass (B) teaches the method wherein at least 10 different polymers are produced (Column 8, lines 22-25).

Regarding Claim 36-37, Bass (B) teaches the method wherein the substrate is moved using a robotic arm (#36b, Fig. 2).

8. Claims 29-33 are rejected under 35 U.S.C. 103(a) as being unpatentable over Bass (B) (U.S. Patent No. 6,440,669, issued 27 August 2002) in view of Anderson et al (U.S. Patent No. 5,186,824, issued 16 February 1993) as applied to Claim 1 above and further in view of Goldberg (U.S. Patent No. 5,959,098, issued 28 September 1999).

Regarding Claim 29-33, Bass and Anderson teach all the elements of Claim 1 as discussed above but are silent regarding the plane of the flow cell or environment. However, flow cells vertical to the horizon (i.e. greater than 75 degrees) were well know

and routinely practiced in the art of polymer synthesis as taught by Goldberg (Fig. 6). Goldberg further teaches this vertical alignment is preferred because it improves fluid circulations and facilitates removal of bubbles (Column 16, lines 13-21). It would have been obvious to one of ordinary skill in the art at the time the claimed invention was made to apply the vertical flow cell arrangement of Goldberg to the flow cell of Bass. One of ordinary skill in the art would have been motivated to do so with a reasonable expectation of success and for the added benefit of improved fluid circulation and facilitated removal of bubbles as desired in the art (Goldberg, Column 16, lines 13-21).

Conclusion

9. No claim is allowed.

Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL.** See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of

the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to BJ Forman whose telephone number is (571) 272-0741. The examiner can normally be reached on 6:00 TO 3:30.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Ram Shukla can be reached on (571) 272-0735. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

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